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10/511,986

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EXAMINER

WHANG, VICTORIA P

ART UNIT

PAPER NUMBER

2809

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
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3 MONTHS

02/23/2007

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary

Application No.

10/511,986

Applicant(s)

YAMAUCHI ET AL.

Examiner

Victoria P. Whang

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 22 April 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-26 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-11, 13-14, 15, 17-19 and 21-26 is/are rejected.
- 7) ☒ Claim(s) 12, 16 and 20 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.


Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 22 April 2003 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.



LYNNE GURLEY
SUPERVISORY PATENT EXAMINER

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date 03/16/2004.

- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____.

DETAILED ACTION

This Office Action is in response to the Application filed 04/22/03.

Currently, claims 1-26 are pending.

Priority

Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

Drawings

1. The drawings are objected to under 37 CFR 1.83(a) because they fail to show movable wall lifting port 16 in Fig. 2 as described in the specification on page 10, line 23. Any structural detail that is essential for a proper understanding of the disclosed invention should be shown in the drawing. MPEP § 608.02(d). Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top

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margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Specification

2. Applicant is reminded of the proper language and format for an abstract of the disclosure.

The abstract should be in narrative form and generally limited to a single paragraph on a separate sheet within the range of 50 to 150 words. It is important that the abstract not exceed 150 words in length since the space provided for the abstract on the computer tape used by the printer is limited. The form and legal phraseology often used in patent claims, such as "means" and "said," should be avoided. The abstract should describe the disclosure sufficiently to assist readers in deciding whether there is a need for consulting the full patent text for details.

The language should be clear and concise and should not repeat information given in the title. It should avoid using phrases which can be implied, such as, "The disclosure concerns," "The disclosure defined by this invention," "The disclosure describes," etc.

3. The abstract of the disclosure is objected to because in line 1 of the abstract, it is suggested that applicant remove and rephrase the word "comprising" since it is legal phraseology often used in patent claims. Correction is required. See MPEP § 608.01(b).

4. The disclosure is objected to because of the following informalities: On page 1, line 11, it is suggested that applicant change the word "accompanying" to "accompanied". On page 2, line 21, it is suggested that applicant change

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"accompaning" to "accompanying the". On page 3, line 6, it is suggested that applicant add the word "be" after "also." On page 14, line 8, it is suggested that applicant change "wall 14" to "wall 15" in order to maintain consistency in the numbering of parts.

Appropriate correction is required.

5. The specification has not been checked to the extent necessary to determine the presence of all possible minor errors. Applicant's cooperation is requested in correcting any errors of which applicant may become aware in the specification.

Claim Objections

6. Claims 1-26 are objected to because of the following informalities:

7. In claim 1, line 6 and line 11, claim 2, line 5, claim 6, line 6, and claim 8, line 6, it is suggested that applicant add the word "said" in front of "both." Appropriate correction is required.

8. In claim 2, lines 1-2 and claim 17 line 2, it is suggested that applicant change "being bonded of said objects" to "of said objects being bonded" in order to maintain consistency. Appropriate correction is required.

9. In claim 14, lines 2, 4 and 6, it is suggested that applicant add the word "both" in front of "objects" in order to maintain consistency. Appropriate correction is required.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

10. Claim 13 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. It is unclear to the Examiner which "one object" and which "other object" is being pressed.

Claim Rejections - 35 USC § 102

11. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

12. Claims 1, 11 and 14-15 are rejected under 35 U.S.C. 102(b) as being clearly anticipated by Hoshi et al. (US 5,129,827, dated 07/14/1992).

1. With respect to claim 1, Hoshi shows the claimed mounting method comprising the steps of: positioning objects being bonded to each other (50a, 50 b; Fig. 3a), which face each other with a gap, relative to each other (fig. 3a, 3b, 5a, 7a, 7b); moving a movable wall (22a, 22b; Fig. 3a) positioned around both objects (col. 3, lines 37-38; The Examiner takes the position that the first and second covers surround the wafer holders which are holding the wafers or objects) until coming into contact with one object holding means (6b) to form a local chamber (52; fig. 3c) having enclosed local space and enclosing both objects (50a,50b) in said local chamber 52 (col. 3, lines 45-47, col. 4, lines 16-19, col. 5, lines 59-60, fig. 3b and 3c; The Examiner takes the position that moving the cover 22a by rotation to contact with cover 22b to form a local chamber constitutes coming into contact with one object holding means 6b); reducing a pressure

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in said local chamber to set an inside of said local chamber at a predetermined vacuum condition (col. 2, lines 4-6, col. 4, lines 7-9, 25-26 and 60-63, col.6, lines 6-7; The Examiner takes the position that by specifying that the pressure is reduced to about 450 mmHg, Hoshi is setting a predetermined vacuum condition); and moving said object holding means (6b) in a direction (arrow A) for reducing volume of said local chamber (col. 4, lines 20-23; The Examiner takes the position that by moving 6b towards 6a, one is inherently reducing the volume of the local chamber); and moving said movable wall following the movement of said object holding means (6b, arrow A; Fig. 3d) and bonding both objects to each other (50a, 50b; fig. 3d) by pressing (col. 4, lines 20-24; The Examiner takes the position that by moving 6b in the direction of 6a to bring them into contact, one is effectively pressing the two together, and since the wall and the object holding means are integrally connected as shown in fig. 3c, the wall or cover will follow the movement of 6b).

2. With respect to claim 11, Hoshi further shows the method as in claim 1 wherein: the inside of said local chamber (52) is sealed against outside (col. 2 lines 13-14, col. 3 lines 45-47, col. 4 lines 16-19, col. 5 lines 59-60, Figs. 3c-f, 5c-f, 7c-f, 8-10) by a contact force of said movable wall to said object holding means (col. 2, lines 15-17; The Examiner takes the position that by folding down support 2 and 4, one is connecting covers 22a and 22b, and this connection can be held together by some contact force. Since the object holding means is integrally connected to support 22b, then inherently, the movable wall cover 22a is being held by a contact force to 22b and thus the object holding means).

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3. With respect to claim 14, Hoshi shows the claimed device comprising:

A movable wall (22a, 22b; Fig. 3a) positioned around said objects (fig. 3a, 50a, 50b; col. 3, lines 37-38; The Examiner takes the position that the first and second covers surround the wafer holders which are holding the wafers or objects), capable of moving until coming into contact with one object holding means (6b; fig. 3a) to form a local chamber (52, fig. 3a) having a local enclosed space capable of enclosing both objects in said local chamber (col. 3, lines 45-47, col. 4, lines 16-19, col. 5, lines 59-60, fig. 3b and 3c; The Examiner takes the position that moving the cover 22a by rotation to contact with cover 22b to form a local chamber constitutes coming into contact with one object holding means 6b), and capable of moving (arrow A) in a direction for reducing a volume of said local chamber following the movement of said object holding means (6b; fig. 3d) (col. 4, lines 20-23; The Examiner takes the position that by moving 6b towards 6a, one is inherently reducing the volume of the local chamber, and that since the wafer holder is integrally connected to cover 22b, then the wall is moving in a direction following the object holding means); and a vacuum suction (20; fig. 3d) means for reducing a pressure in said local chamber to set an inside of said local chamber at a predetermined vacuum condition (col. 2, lines 4-6, col. 4, lines 7-9, 25-26 and 60-63, col. 6, lines 6-7; The Examiner takes the position that by specifying that the pressure is reduced to about 450 mmHg, Hoshi is setting a predetermined vacuum condition).

4. With respect to claim 15, Hoshi shows the claimed device wherein the mounting device has a cylinder means (38; fig. 2) for moving the movable wall (col. 3, lines 53-57; The Examiner takes the position that by moving 6b in the direction of 6a to bring them

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into contact, one is effectively pressing the two together, and since the wall and the object holding means are integrally connected as shown in fig. 3c, the wall or cover will follow the movement of 6b).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Claims 2-5, 8-10, 17-19, 23-24, 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hoshi et al. (US 5,129,827, dated 07/14/1992) in view of Suga et al. (US PGPub 2003/0168145, dated 09/11/2003, filed 08/06/2001).

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5. With respect to claim 2, Hoshi discloses all of the limitations from claim 1, as discussed previously.

Hoshi fails to explicitly disclose that surfaces being bonded of objects are cleaned in the local chamber by an energy wave or energy particle beam after the pressure in a local chamber is reduced to set the inside of the local chamber at a predetermined vacuum condition, and thereafter, an object holding means and a movable wall following the object holding means are moved and both objects are bonded to each other by pressing.

Suga teaches cleaning the surfaces being bonded of the objects are cleaned by an energy wave or energy particle beam (parag. [0013] lines 3-6, parag. [0019] lines 1-4) after the pressure in the local chamber is reduced (parag. [0019] lines 15-18, parag. [0028] lines 4-7, parag. [0029] lines 1-4), and thereafter both objects are bonded to each other (parag. 13, lines 3-8).

Hoshi and Suga are analogous art because they are from the same field of endeavor of bonding multiple objects together.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to use Suga's method of cleaning the surfaces of the objects being bonded in a reduced pressure local chamber prior to bonding in Hoshi's method. The motivation to use Suga's method of cleaning the surfaces to be bonded in a reduced pressure local chamber prior to bonding in Hoshi would have been that Suga's method increases the effect of cleaning (Suga, parag. [0013] lines 12-14, parag. [0019] lines 17-18) and also achieves more reliable bonding (Suga, parag. [0019] lines 10-12).

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Therefore it would have been obvious to combine Hoshi with Suga to obtain the method as specified in claim 2 with a reasonable expectation of success.

6. With respect to claim 3, Hoshi as modified by Suga teaches all of the limitations from claim 2 as previously discussed.

Hoshi fails to explicitly disclose that cleaning is carried out under a predetermined vacuum condition.

Suga further discloses that the cleaning is carried out under a predetermined vacuum condition (parag. [0028] lines 4-7, parag. [0029] lines 1-4).

Hoshi and Suga are analogous art because they are from the same field of endeavor of bonding multiple objects together.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to use Suga's method of cleaning the surfaces of the objects being bonded under a predetermined vacuum condition in Hoshi's method. The motivation to use Suga's method of cleaning the surfaces to be bonded in a predetermined vacuum condition prior to bonding in Hoshi would have been that Suga's method increases the effect of cleaning (Suga, parag. [0013] lines 12-14, parag. [0019] lines 17-18) and also achieves more reliable bonding (Suga, parag. [0019] lines 10-12). Therefore it would have been obvious to combine Hoshi with Suga to obtain the method as specified in claim 3 with a reasonable expectation of success.

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7. With respect to claim 4, Hoshi as modified by Suga teaches all of the limitations from claim 2 as previously discussed.

Hoshi fails to explicitly disclose that after cleaning and before bonding, the inside atmosphere of a local chamber is replaced with an atmospheric inert or oxidizing gas.

Suga further teaches that after cleaning and before bonding, the inside atmosphere of a local chamber is replaced with an atmospheric inert or oxidizing gas (parag. [0013] lines 3-7, parag. [0012] lines 3-12; The Examiner takes the position that a gas which contains oxygen is the same as an oxidizing gas).

Hoshi and Suga are analogous art because they are from the same field of endeavor of bonding multiple objects together.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to use Suga's method of replacing the inside atmosphere of a local chamber with an atmospheric inert or oxidizing gas after cleaning and before bonding in Hoshi's method. The motivation to use Suga's method of replacing the inside atmosphere of a local chamber with an atmospheric inert or oxidizing gas after cleaning and before bonding in Hoshi would have been that Suga's method suppresses oxidation at the bonded portion between the objects, prevents a reaction and adhesion of contamination which can obstruct bonding, and allows a more reliable bonding state to be obtained (Suga, parag. [0012] line 13-17, parag. [0029] lines 9-14). Therefore it would have been obvious to combine Hoshi with Suga to obtain the method as specified in claim 4 with a reasonable expectation of success.

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8. With respect to claim 5, Hoshi as modified by Suga teaches all of the limitations from claim 2 as previously discussed.

Hoshi fails to explicitly disclose that the energy wave or energy particle beam is a plasma.

Suga further teaches that the energy wave or energy particle beam is a plasma (parag. [0013] lines 8-10, parag. [0019] lines 13-14).

Hoshi and Suga are analogous art because they are from the same field of endeavor of bonding multiple objects together.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to use Suga's method that an energy wave or energy particle beam is a plasma in Hoshi's method. The motivation to use Suga's method that an energy wave or energy particle beam is a plasma in Hoshi would have been that Suga's method allows the possibility of removing oxides and organic substances from the surfaces of the objects (Suga, parag. [0019] lines 6-10). Therefore it would have been obvious to combine Hoshi with Suga to obtain the method as specified in claim 5 with a reasonable expectation of success.

9. With respect to claim 8, Hoshi discloses all of the limitations from claim 1, as discussed previously.

Hoshi fails to explicitly disclose that the inside of the local chamber is set at an atmosphere condition of a specified gas after the pressure in the local chamber is reduced to a predetermined vacuum condition, and under the specified gas atmosphere

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condition, the object holding means and movable wall following the object holding means are moved and both objects are bonded to each other by pressing.

Suga teaches that the inside of the local chamber is set at an atmosphere condition of a specified gas after the pressure is reduced to a predetermined vacuum condition (parag. [0012] lines 1-12), and under the specified gas atmosphere condition, an object holding means and movable wall following the object holding means are moved and both objects are bonded to each other by pressing (parag. [0015] lines 9-20).

Hoshi and Suga are analogous art because they are from the same field of endeavor of bonding multiple objects together.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to use Suga's method of setting the inside of the local chamber at an atmosphere condition of a specified gas after the pressure is reduced to a predetermined vacuum condition, and under the specified gas atmosphere condition, an object holding means and movable wall following the object holding means are moved and both objects are bonded to each other by pressing in Hoshi's method. The motivation to use Suga's method of setting the inside of the local chamber at an atmosphere condition of a specified gas after the pressure is reduced to a predetermined vacuum condition in Hoshi would have been that Suga's method suppresses oxidation at the bonded portion between the objects, prevents a reaction and adhesion of contamination which can obstruct bonding, and allows a more reliable bonding state to be obtained (Suga, parag. [0012] line 13-17, parag. [0029] lines 9-14).

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Therefore it would have been obvious to combine Hoshi with Suga to obtain the method as specified in claim 8 with a reasonable expectation of success.

10. With respect to claim 9, Hoshi as modified by Suga teaches all of the limitations from claim 8 as previously discussed.

Hoshi fails to explicitly disclose that the inside of the local chamber is set at a specific gas atmosphere condition with an atmospheric pressure.

Suga further teaches that the inside of the local chamber is set at a specific gas atmosphere condition with an atmospheric pressure (parag. [0012] lines 3-4; The Examiner takes the position that any chamber with a specific atmosphere condition will have an atmospheric pressure).

Hoshi and Suga are analogous art because they are from the same field of endeavor of bonding multiple objects together.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to use Suga's method of setting the inside of the local chamber at a specific gas atmosphere condition with an atmospheric pressure in Hoshi's method. The motivation to use Suga's method of setting the inside of the local chamber at a specific gas atmosphere condition with an atmospheric pressure in Hoshi would have been that Suga's method suppresses oxidation at the bonded portion between the objects, prevents a reaction and adhesion of contamination which can obstruct bonding, and allows a more reliable bonding state to be obtained (Suga, parag. [0012] line 13-17, parag. [0029] lines 9-14). Therefore it would have been obvious to combine Hoshi with

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Suga to obtain the method as specified in claim 9 with a reasonable expectation of success.

11. With respect to claim 10, Hoshi as modified by Suga teaches all of the limitations from claim 8 as previously discussed.

Hoshi fails to explicitly disclose that an inert gas, a non-oxidizing gas, a reducing gas or a substitutional gas is used as the specified gas.

Suga further teaches that an inert gas, a non-oxidizing gas, a reducing gas or a substitutional gas is used as the specified gas (parag. [0012] lines 3-12).

Hoshi and Suga are analogous art because they are from the same field of endeavor of bonding multiple objects together.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to use Suga's method that the specified gas is an inert gas, a non-oxidizing gas, a reducing gas or a substitutional gas in Hoshi's method. The motivation to use Suga's method that the specified gas is an inert gas, a non-oxidizing gas, a reducing gas or a substitutional gas in Hoshi would have been that Suga's method suppresses oxidation at the bonded portion between the objects, prevents a reaction and adhesion of contamination which can obstruct bonding, and allows a more reliable bonding state to be obtained (Suga, parag. [0012] line 13-17, parag. [0029] lines 9-14). Therefore it would have been obvious to combine Hoshi with Suga to obtain the method as specified in claim 10 with a reasonable expectation of success.

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12. With respect to claim 17, Hoshi discloses all of the limitations of claim 14 as previously discussed.

Hoshi fails to explicitly disclose that the mounting device has means for cleaning surfaces being bonded of the objects in the local chamber by an energy wave or energy particle beam.

Suga teaches that the device has means for cleaning the surfaces being bonded of the objects by an energy wave or energy particle beam (parag. [0013] lines 3-6, parag. [0019] lines 1-4).

Hoshi and Suga are analogous art because they are from the same field of endeavor of bonding multiple objects together.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to use Suga's device with means for cleaning the surfaces of the objects by an energy wave or energy particle beam in Hoshi's device. The motivation to use Suga's device with means for cleaning the surfaces to be bonded in Hoshi would have been that Suga's device allows the possibility of removing oxides and organic substances from the surfaces of the objects (Suga, parag. [0019] lines 6-10). Therefore it would have been obvious to combine Hoshi with Suga to obtain the device as specified in claim 17 with a reasonable expectation of success.

13. With respect to claim 18, Hoshi as modified by Suga teaches all of the limitations of claim 17 as previously discussed.

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Hoshi fails to explicitly disclose that the mounting device has a gas supply means for replacing the inside of the local chamber with an atmosphere of an inert gas or a non-oxidizing gas at the time of and/or after cleaning.

Suga further teaches that the device has a gas supply means (10; fig. 1) for replacing the inside of the local chamber with an atmosphere of an inert gas or a non-oxidizing gas at the time of and/or after cleaning (parag. 12 lines 3-12, parag. [0029] lines 5-9).

Hoshi and Suga are analogous art because they are from the same field of endeavor of bonding multiple objects together.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to use Suga's device with a gas supply means for replacing the inside of the local chamber with an atmosphere of an inert gas or a non-oxidizing gas at the time of and/or after cleaning Hoshi's device. The motivation to use Suga's device with gas supply means for replacing the inside of the local chamber with an atmosphere of an inert gas or a non-oxidizing gas in Hoshi would have been that Suga's device could prevent oxidation of the bonding portions of the objects as well as provide a more reliable bonding state to be obtained (Suga, parag. [0012] line 13-17, parag. [0029] lines 9-14). . Therefore it would have been obvious to combine Hoshi with Suga to obtain the device as specified in claim 18 with a reasonable expectation of success.

14. With respect to claim 19, Hoshi as modified by Suga teaches all of the limitations of claim 17 as previously discussed.

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Hoshi fails to explicitly disclose that the energy wave or energy particle beam is a plasma.

Suga further teaches that the energy wave or energy particle beam is a plasma (parag. [0013] lines 8-10, parag. [0019] lines 13-14).

Hoshi and Suga are analogous art because they are from the same field of endeavor of bonding multiple objects together.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to use Suga's method that an energy wave or energy particle beam is a plasma in Hoshi's method. The motivation to use Suga's method that an energy wave or energy particle beam is a plasma in Hoshi would have been that Suga's method allows the possibility of removing oxides and organic substances from the surfaces of the objects (Suga, parag. [0019] lines 6-10). Therefore it would have been obvious to combine Hoshi with Suga to obtain the method as specified in claim 19 with a reasonable expectation of success.

15. With respect to claim 23, Hoshi discloses all of the limitations of claim 14 as previously discussed.

Hoshi fails to explicitly disclose that the mounting device has a specified gas supply means for setting the inside of the local chamber at an atmosphere condition of a specified gas after the pressure in the local chamber is reduced to set the inside of the local chamber at a predetermined vacuum condition.

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Suga teaches that the mounting device has a specified gas supply means (10; fig. 1) for setting the inside of the local chamber is at an atmosphere condition of a specified gas after the pressure is reduced to a predetermined vacuum condition (parag. [0012] lines 1-12).

Hoshi and Suga are analogous art because they are from the same field of endeavor of bonding multiple objects together.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to use Suga's device with a specified gas supply means for setting the inside of the local chamber at an atmosphere condition of a specified gas after the pressure is reduced to a predetermined vacuum condition in Hoshi's method. The motivation to use Suga's device with a specified gas supply means for setting the inside of the local chamber at an atmosphere condition of a specified gas after the pressure is reduced to a predetermined vacuum condition in Hoshi would have been that Suga's device suppresses oxidation at the bonded portion between the objects, prevents a reaction and adhesion of contamination which can obstruct bonding, and allows a more reliable bonding state to be obtained (Suga, parag. [0012] line 13-17, parag. [0029] lines 9-14). Therefore it would have been obvious to combine Hoshi with Suga to obtain the method as specified in claim 23 with a reasonable expectation of success.

16. With respect to claim 24, Hoshi as modified by Suga teaches all of the limitations of claim 23 as previously discussed.

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Hoshi fails to explicitly disclose that an inert gas, a non-oxidizing gas, a reducing gas or a substitutional gas is used as the specified gas.

Suga further teaches that an inert gas, a non-oxidizing gas, a reducing gas or a substitutional gas is used as the specified gas (parag. [0012] lines 3-12).

Hoshi and Suga are analogous art because they are from the same field of endeavor of bonding multiple objects together.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to use Suga's method that the specified gas is an inert gas, a non-oxidizing gas, a reducing gas or a substitutional gas in Hoshi's method. The motivation to use Suga's method that the specified gas is an inert gas, a non-oxidizing gas, a reducing gas or a substitutional gas in Hoshi would have been that Suga's method suppresses oxidation at the bonded portion between the objects, prevents a reaction and adhesion of contamination which can obstruct bonding, and allows a more reliable bonding state to be obtained (Suga, parag. [0012] line 13-17, parag. [0029] lines 9-14). Therefore it would have been obvious to combine Hoshi with Suga to obtain the method as specified in claim 24 with a reasonable expectation of success.

17. With respect to claim 26, Hoshi discloses all of the limitations of claim 14 as previously discussed.

Hoshi fails to explicitly disclose that at least one object holding means has an electrostatic chucking means for holding the object electrostatically.

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Suga teaches that the means for directly holding an object is formed from an electrostatic chuck (21; fig. 1; The Examiner takes the position that electrostatic chucks inherently hold an object electrostatically).

Hoshi and Suga are analogous art because they are from the same field of endeavor of bonding multiple objects together.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to use Suga's device of an object holding means with having an electrostatic chucking means in Hoshi's device. The motivation to use Suga's device of an object holding means having an electrostatic chucking means in Hoshi would have been that Suga's device could bond the two objects together at a desirable condition and produce an extremely reliable formation (Suga, parag. [0043] lines 17-19).

Therefore it would have been obvious to combine Hoshi with Suga to obtain the method as specified in claim 24 with a reasonable expectation of success.

Claims 21-22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hoshi et al. (US 5,129,827, dated 07/14/1992) in view of Suga et al. (US PGPub 2003/0168145, dated 09/11/2003, filed 08/06/2001). as applied to claims 2-5, 8-10, 17-19, 23-24 above, and further in view of Sato et al. (US PGPub 2002/0042161, dated 04/11/2002, filed 09/19/2001).

18. With respect to claim 21, Hoshi as modified by Suga teaches all of the limitations of claim 19 as previously discussed.

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Hoshi as modified by Suga fails to explicitly disclose that the device has means for applying a sealing material is onto a surface of one object.

Sato teaches, conventionally (parag. [0005] lines 1-10), a means for applying (2; Fig. 1, parag. [0037] lines 4-6) a layer of sealing material (8; Fig. 1) on onto a substrate (3; Fig. 1)

Hoshi and Sato are analogous art because they are from the same field of endeavor of bonding multiple objects together.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to use Sato's device with a means for applying a sealing material onto a surface of one object in Hoshi's device. The motivation to use Sato's device with a means for applying a sealing material onto a surface of one object in Hoshi would have been that Sato's device is conventionally used in arts related to bonding multiple objects together (Sato, parag. [0005] lines 1-10). Therefore it would have been obvious to combine Hoshi with Sato to obtain the method as specified in claim 21 with a reasonable expectation of success.

19. With respect to claim 22, Hoshi as modified by Suga as further modified by Sato teaches all of the limitations of claim 21 as previously discussed.

Hoshi as modified by Suga fails to explicitly disclose that the sealing material is a non-conductive paste or an anisotropic conductive paste.

Sato further teaches that, conventionally, the sealing material is a non-conductive paste or an anisotropic conductive paste (parag. [0005] lines 7-11).

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It would have been obvious to one of ordinary skill in the art at the time the invention was made to use Sato's method of using sealing material that is a non-conductive paste or an anisotropic conductive paste Hoshi's method. The motivation to use Sato's method of using a sealing material that is a non-conductive paste or an anisotropic conductive paste in Hoshi would have been that Sato's method is conventionally used in arts related to bonding multiple objects together (Sato, parag. [0005] lines 1-11). Therefore it would have been obvious to combine Hoshi with Sato to obtain the method as specified in claim 22 with a reasonable expectation of success.

Claims 6-7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hoshi et al. (US 5,129,827, dated 07/14/1992) in view of Sato et al. (US PGPub 2002/0042161, dated 04/11/2002, filed 09/19/2001).

20. With respect to claim 6, Hoshi discloses all of the limitations of claim 1 as previously discussed.

Hoshi fails to explicitly disclose that a sealing material is applied onto a surface of one object, and at the sealing material applied condition, the objects are bonded to each other in sealing material by pressing.

Sato teaches that, conventionally (parag. [0005] lines 1-10), a layer of sealing material (8; Fig. 1) is formed on an upper surface of a chip component (5; Fig. 1) after cutting (parag. [0014] lines 1-5), and the objects are bonded to each other in sealing

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material by pressing (parag. [0016] lines 1-3; The Examiner takes the position that regular pressure bonding can include pressing).

Hoshi and Sato are analogous art because they are from the same field of endeavor of bonding multiple objects together.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to use Sato's method of using a layer of sealing material to bond objects together in Hoshi's method. The motivation to use Sato's method of applying a sealing material on an object in Hoshi would have been that Sato's method is conventionally used in arts related to bonding multiple objects together (Sato, parag. [0005] lines 1-10). Therefore it would have been obvious to combine Hoshi with Sato to obtain the method as specified in claim 6 with a reasonable expectation of success.

21. With respect to claim 7, Hoshi as modified by Sato teaches all of the limitations of claim 6 as previously discussed.

Hoshi fails to explicitly disclose that the sealing material is a non-conductive paste or an anisotropic conductive paste.

Sato further teaches that, conventionally, the sealing material is a non-conductive paste or an anisotropic conductive paste (parag. [0005] lines 7-11).

Hoshi and Sato are analogous art because they are from the same field of endeavor of bonding multiple objects together.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to use Sato's method of using sealing material that is a non-conductive paste or an anisotropic conductive paste Hoshi's method. The motivation to

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use Sato's method of using a sealing material that is a non-conductive paste or an anisotropic conductive paste in Hoshi would have been that Sato's method is conventionally used in arts related to bonding multiple objects together (Sato, parag. [0005] lines 1-11). Therefore it would have been obvious to combine Hoshi with Sato to obtain the method as specified in claim 7 with a reasonable expectation of success.

Claim 25 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hoshi et al. (US 5,129,827, dated 07/14/1992) in view of Suga et al. (US PGPub 2003/0164396 dated 09/04/2003, filed 08/06/2001).

22. With respect to claim 25, Hoshi discloses all of the limitations of claim 14 as previously discussed.

Hoshi fails to explicitly disclose that at least one object holding means has a heating means.

Suga teaches that a mounting device (1; Fig. 1) with a bonding means (4; fig. 1) having a heating means (4; fig. 1; The Examiner takes the position that the bonding means with a function for heating can serve as a heating means).

Hoshi and Suga are analogous art because they are from the same field of endeavor of bonding multiple objects together.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to use Suga's device of using a heating means in an object holding means in Hoshi's device. The motivation to use Suga's device with a heating means in

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Hoshi would have been that Suga's device allows removal of a fine gap and residual stress on an interface between objects (Suga, parag. [0013] lines 11-13). Therefore it would have been obvious to combine Hoshi with Suga to obtain the method as specified in claim 25 with a reasonable expectation of success.

Allowable Subject Matter

23. Claims 12, 16 and 20 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

24. The following is a statement of reasons for the indication of allowable subject matter: With respect to claim 12, the prior art does not teach that a force acting to the object holding means by the pressure in the local chamber and a contact force of the movable wall to the object holding means are substantially balanced. With respect to claim 16, the prior art does not teach that a seal member capable of being elastically deformed is provided at a tip of the movable wall. With respect to claim 20, the prior art does not teach that each of the object holding means has an electrode for generating plasma.

Conclusion

25. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. US 5,916,513, US 6,836,959 and US 6,193,130 are considered pertinent prior art because they are all in the same field of endeavor of bonding substrates together.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Victoria P. Whang whose telephone number is (571) 270-1564. The examiner can normally be reached on Monday through Friday 7:30 AM to 5:00 PM E.S.T.


If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Lynne Gurley can be reached on (571) 272-1670. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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V.P.W

1/25/2007


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